TERRORIST THREAT PROTECTION

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Introduction

After the terrorist bombing of the Khobar Towers in Dhahran, Saudi Arabia, DOD established directives that made commanders responsible for implementing plans and procedures within their organizations to enhance force protection from terrorist attack. While anti-terrorist plans and procedures were developed for our U.S.-based installations, the perceived threat was believed to be very low, with the greatest threat to our military and civilian personnel deployed overseas. However, the September 11, 2001, attack on America has highlighted our vulnerability to attack by transnational terrorists. With this threat far greater than previously assessed, DOD installations have had to significantly increase security well beyond their prior anti-terrorist plan. The cost of increased security has yet to be determined in terms of dollars, manpower, and readiness.

The trend during the past 25 years has been to make DOD installations more integrated with the surrounding communities, with many of the installations open to the public with little or no perimeter control. This policy of openness was well founded at the time and provided significant benefits to installations and communities, but this trend is problematic when it is necessary to increase the Army's security at times of heightened threat.

The Army's installations must be transformed to support the Army transformation to the Objective Force while continuing to serve the ongoing needs of the Legacy Force. The Army transformation will have a major impact on installation infrastructure, services, personnel, the environment, and surrounding communities. Prior to September 11, anti-terrorism force protection issues were a consideration in the Army installation transformation process. After September 11, they are a driver and must be addressed upfront in the planning process for transforming installations to support the Objective Force.

Threat Protection Research

The U.S. Army Engineer Research and Development Center (ERDC), via the Army's Survivability and Protective Structure Research, Development, Test and Evaluation Program, is developing technology to protect the occupants of buildings from terrorist bomb attacks. This protection can be enhanced by an appropriate balance between better security procedures, including the enforcement of increased standoff distances, and the use of blast hardening and mitigation techniques. ERDC's research addresses the blast hardening and mitigation and required standoff distance aspects of the problem. The goal is to develop technology to protect people inside buildings from terrorist bombs through blast mitigation techniques. Injuries and deaths come from two primary sources in terrorist bombing incidents: structural collapse and flying debris. While structural collapse accounts for the majority of deaths, flying debris can also result in deaths and causes the most injuries. The research focuses on mitigating these effects.

To achieve this, program personnel conduct research aimed at developing physics-based models for assessing the vulnerability of conventional construction to terrorist weapon threats, developing cost-effective construction materials and techniques to protect building occupants, and developing the associated analytical method necessary for their design.

Vulnerability assessment methods are necessary to determine the potential hazard an installation would face in the event of a terrorist bombing. To support the transfer of the results of the research to the warfighter, ERDC has developed an Anti-Terrorism Planner (AT Planner) tool to assist the commander's staff in planning and implementing protective measures required for force protection. The AT Planner provides users with a computerized analysis tool, running on a notebook computer, for evaluating critical assets in terrorist threat scenarios based on aggressors, tactics, and weapon systems.

Threat conditions dictate a number of security measures from Field Manual (FM) 5-114, *Engineer Operations Short of War*, which the user must consider and possibly employ. These measures are cumulative from the lowest to the highest threat level and are presented by the AT Planner in a concise and user-friendly format. Emphasis has been placed on the evaluation of structural components, windows, personnel, and other limited critical assets. Structural components are defined for frames, walls, and roofs from common construction materials. Damage to the building components is calculated using physics-based algorithms that relate damage to pressure-impulse curve, with the user providing the distance of the explosive charge from the building.

AT Planner can also provide the required standoff for a given explosive charge. Once the appropriate standoff is determined based on expected explosive size and an acceptable level of building damage, the program provides information on protective barriers and a vehicle velocity calculator to aid in barrier and obstacle selection. Extensive information is available on various types of obstacles and protective barriers in the "Help" file, and the information source is referenced.

AT Planner also provides a basis for design and analysis of wall and window retrofits. The capability is available to view facility or site images, locate assets on the site

image, and show building damage in 2-D and 3-D graphical formats. Blast walls can be placed in front of structures, and the resulting damage to a protected building can be calculated. Glass hazard calculations have been incorporated along with user-defined pressure-impulse curves to give structural engineers more flexibility in evaluating structures.

AT Planner is updated on a regular basis to include user feedback and recommendations. Recent enhancements include additional capabilities allowing more editable material properties for structure definition, better visualization of personnel injuries and structural damage, and additional retrofit measures and their analyses.

AT Planner is being used by the Joint Services Integrated Vulnerability Assessment Teams in conducting assessments of more than 500 military facilities worldwide for the Joint Chiefs of Staff (JCS), in assessing embassy facilities for the Department of State, and in assessing vulnerability of key facilities worldwide for the CIA. AT Planner has been used to develop the physical security plan for the U.S. Capitol complex to assist the U.S. Capitol Police and to provide assessments of the Pentagon for the JCS. It has more than 400 registered users. Based on threat, mission, and site considerations, AT Planner provides a tool for evaluation of protective measures, expedient structure designs, and standoff guidance. It has reduced the time needed to analyze building damage and required safe standoff distance from weeks to less than a day.

Force Protection Modeling

The "Fort Future" concept (see article on Page 14), in very simplistic terms, is a modeling and simulation (M&S) environment similar to the Simulation and Modeling for Acquisition, Requirements and Training (SMART) initiative. Fort Future will enable planners to use virtual technology in deciding among multiple, complex options for posturing Army bases to meet future Army transformation requirements. While force protection is a thrust in the Fort Future system concept, its primary focus had been on the integration of models to evaluate the building design at each phase for the effects of terrorist explosive and chemical/biological attacks. With force protection now a top priority of DOD installations, it is clear that there is need for the force protection portion of the Fort Future M&S environment to be significantly strengthened to support a more robust capability that addresses the full range of threats for not only the individual building, but for groups of buildings, overall installation protection, and protection to its lifelines and lines of communication.

This need could be fulfilled through an Anti-Terrorist Protection Planning and Analysis System with a robust M&S environment, capable of evaluating the full range of terrorist threats (high explosive, standoff weapons, and chemical/biological). The detection, denial, protection, and mitigation of multithreat terrorist attacks could be assessed through a "system-of-systems" approach to the layered security concept (perimeter control, external threat protection, and invasive threat protection). The system will allow analysis at the building and at the installation, and provide lifelines and lines of communication. Each level will be analyzed for critical systems and subsystems, including the interrelationships that will provide for vital defense in-depth.

New technologies that provide increased protection of current and future DOD facilities through integrated protection systems, mitigation of effects from multiple threats, and increased perimeter security could be evaluated to maximize the protection versus cost. Physics-based 3-D visualization tools (visual as well as other spectral regions) could be employed to enhance the design and planning process with the ability to analyze the impact of integrating structures, barriers, and physical security requirements (e.g., line-of-sight and illumination analysis and radiant temperatures for infrared camera locations). The common underlying security principles of detect, assess, deter, and respond would provide the basis for a holistic integration of security technologies and processes to ensure life safety and mission readiness.

In addition, a complete installation force protection analysis could become a crisis response planning and training tool for the installation command and first-responder teams. The command will be able to exercise and train all installation support agencies (military police, medical, fire, directorate of public works, safety, and other members of the garrison command staff) in various threat scenarios as defined by the command and under adverse conditions (threat posture, holiday, time of day (e.g., rush hour), and adverse weather).

Conclusion

With force protection a top priority for DOD installations, transforming them to support the Army transformation to the Objective Force will require the integration of assessment, detection, denial, protection, and mitigation technologies for multithreat terrorist attack into the planning process. A robust capability that addresses the full range of threats for not only the individual building, but for groups of buildings, overall installation protection, and protection to its lifelines and lines of communication will be needed to provide the holistic integrated security necessary to ensure life safety and mission readiness.

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